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10/727,039	12/04/2003	Hai-Wen Chen	4358-0116P	4864

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EXAMINER
LEE, JOHN W

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
11/08/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/727,039	CHEN ET AL.	
	Examiner	Art Unit	
	John Wahnkyo Lee	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The response received on 21 September 2007 has been placed in the file and was considered by the examiner. An action on the merits follows.

Response to Amendment

2. The applicant's amendments filed on 21 September 2007 have been fully considered.

OBJECTIONS TO THE SPECIFICATION

Applicant's arguments to the objection to the specification have been fully considered and are persuasive. The objection to the specification is hereby withdrawn.

35 U.S.C. 112, 2 ND PARAGRAPH REJECTION

Applicant's arguments to the rejection under 35 U.S.C. § 112 with respect to claims 2, 13-14, and 18 have been fully considered and are persuasive by the applicant amending the claims. The rejection under 35 U.S.C. § 101 with respect to claims 2, 13-14, and 18 is hereby withdrawn.

Response to Arguments

3. Applicant's arguments filed on 21 September 2007 have been fully considered.

4. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2, 4-5, 7-10, 15-16, 19-21, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alderson et al. (2002/0159101) in view of Endo (US 2004/0017891).

Regarding claim 1, Alderson discloses a system for reducing noise in a detection sensor (abstract, "IR detector array"; Fig. 1- 100 and 102; paragraph [0005]), comprising: a raw digital image of pixels corresponding to energy received at the sensor (Fig. 1; paragraph [0035]); a non-uniformity correction device to remove estimated fixed pattern noise from the pixels of the raw digital image to generate a corrected digital image (abstract; paragraph [0005]); and an array of coefficients to determine the estimated fixed pattern noise, wherein the array of coefficients is based on actual fixed pattern noise measurements that are parametrically fitted over a plurality of temperature ranges (Figs. 2A and 2B; paragraphs [0045]-[0046]). However, Alderson does not disclose last claim limitation. Instead of Alderson, Endo discloses wherein the estimated fixed pattern noise (paragraph [0023], $\sqrt{2}\sigma$) is a difference between a standard deviation of a residual noise (paragraph [0023], "dark image output") and a standard deviation of a temporal noise (paragraph [0023], "random noise") within a frame (paragraphs [0022]-[0023]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention in Alderson's invention to improve reliability and image quality (abstract) as suggested by Endo.

Regarding claim 2, Alderson further discloses each of the plurality of temperature ranges has an integration time for the sensor (Fig. 2A; paragraph [0043]).

Regarding claim 4, Alderson further discloses the integration time is an integration time for a focal plane array for the sensor (paragraph [0043]).

Regarding claim 5, Alderson further discloses the raw digital image corresponds to the energy received at the focal plane array (Fig. 1, "thermal radiation"; abstract; paragraph [0043]).

Regarding claim 7, Alderson further discloses that the non-uniformity correction device includes an estimator to determine the estimated fixed pattern noise over a set of the plurality of temperature ranges (Fig. 2B, paragraph [0047]).

Regarding claim 8, Alderson further discloses that the non-uniformity correction device includes a plurality of estimators to determine the estimated fixed noise over a set of the plurality of temperature ranges (Fig. 2B, paragraph [0047]).

Regarding claim 9, Alderson further discloses the array of coefficients includes a first set of coefficients and a second set of coefficients (Figs. 3 and 4; paragraphs [0048]-[0050]).

Regarding claim 10, Alderson further discloses the first set of coefficients correlate to a first set of the plurality of temperature ranges, and the second set of

coefficients correlate to a second set of the plurality of temperature ranges (Figs. 3 and 4; paragraphs [0048]-[0050]).

Regarding claim 15, Alderson discloses a method for reducing noise in a sensor (abstract, "IR detector array"; Fig. 1- 100 and 102; paragraph [0005]), comprising: converting received energy into a raw digital image (Fig. 1; paragraph [0035]); estimating fixed pattern noise in the raw digital image by using an array of coefficients of parametrically fitted measurements of actual fixed pattern noise over a temperature range of a plurality of temperature ranges (Figs. 2A and 2B; paragraphs [0045]-[0046]); and generating a corrected digital image by removing the estimated fixed pattern noise from the raw digital image (Fig. 4-408; paragraph [0051]). However, Alderson does not disclose last claim limitation. Instead of Alderson, Endo discloses wherein the estimated fixed pattern noise (paragraph [0023], $\sqrt{2}\sigma$) is a difference between a standard deviation of a residual noise (paragraph [0023], "dark image output") and a standard deviation of a temporal noise (paragraph [0023], "random noise") within a frame (paragraphs [0022]-[0023]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention in Alderson's invention to improve reliability and image quality (abstract) as suggested by Endo.

Regarding claim 16, Alderson further discloses applying a gain and an offset from the array of coefficients to pixel intensity in the raw digital image (Fig. 5; paragraphs [0050], [0057], and [0058]).

Regarding claim 19, Alderson further discloses selecting the array of coefficients according to the temperature range (paragraph [0056]).

Regarding claim 20, Alderson discloses a method for reducing noise in a digital image corresponding to energy received at a sensor (abstract, "IR detector array"; Fig. 1- 100 and 102; paragraph [0005]), comprising: estimating fixed pattern noise in the digital image using an array of coefficients for a temperature range of a plurality of temperature ranges, wherein the array of coefficients represent a gain and an offset of the fixed pattern noise (Figs. 2A and 2B; abstract; paragraphs [0005] and [0045]-[0046]); and removing the estimated fixed pattern noise from the digital image to generate a corrected digital image (Fig. 4-408; paragraph [0051]). However, Alderson does not disclose last claim limitation. Instead of Alderson, Endo discloses wherein the estimated fixed pattern noise (paragraph [0023], $\sqrt{2}\sigma$) is a difference between a standard deviation of a residual noise (paragraph [0023], "dark image output") and a standard deviation of a temporal noise (paragraph [0023], "random noise") within a frame (paragraphs [0022]-[0023]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention in Alderson's invention to improve reliability and image quality (abstract) as suggested by Endo.

Regarding claim 21, Alderson further discloses converting the received energy into the digital image (Figs 1 and 4; paragraph [0051]).

Regarding claim 24, Alderson discloses that various actions of the invention can be performed by a computer or a program instructions being executed one or more

processors (paragraph [0033]). Moreover, claim 24 is analogous and corresponds to claim 15. See rejection of claim 15 for further explanation.

Regarding claim 25, Alderson discloses that various actions of the invention can be performed by a computer or a program instructions being executed one or more processors (paragraph [0033]). Moreover, claim 25 is analogous and corresponds to claim 20. See rejection of claim 20 for further explanation.

7. Claims 3, 11-14, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alderson et al. (2002/0159101) in view of Endo (US 2004/0017891), and further in view of Harton et al. (2003/0107666).

Regarding claim 3, Alderson and Endo disclose all the claim limitations of the previous claim except the claim limitation of claim 3. However, Harton discloses a time integrating pixel architecture (Fig. 1-100) comprising a capacitor (Fig. 1-104; paragraph [0015]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention and Harton's invention in Alderson's invention to provide improved performance as suggested by Alderson (paragraph [0008]).

Regarding claim 11, Alderson discloses a sensor system for detecting candidate targets from received energy at an array of detectors within the sensor system (abstract, "IR detector array"; Fig. 1- 100 and 102; paragraph [0005]), comprising: an analog-to-digital converter to convert the voltage to a raw digital image having pixel data of the candidate targets (Fig. 1-104); a non-uniformity correction device to estimate the fixed

pattern noise using an array of measurement-based parametrically fitted coefficients corresponding to a temperature range for the sensor system and to remove the estimated fixed pattern noise from the raw digital image; and (abstract; Figs. 2A, 2B, and 4-408; paragraphs [0005], [0045]-[0046], [0051]); and a corrected image generated by the non-uniformity correction device that emphasizes the candidate targets in the pixel data (Fig. 4-408 and 412; paragraph [0051]). However, Alderson does not disclose rest of the claim limitations. Instead of Alderson, Endo discloses wherein the non-uniformity correction devices estimates fixed pattern noise (paragraph [0023], $\sqrt{2}\sigma$) is a difference between a standard deviation of a residual noise (paragraph [0023], "dark image output") and a standard deviation of a temporal noise (paragraph [0023], "random noise") within a frame (paragraphs [0022]-[0023]) and Harton discloses the integration capacitors to control an integration time for the array of detectors to generate a voltage corresponding to the received energy (Fig. 1-100 and 104; paragraph [0015]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention and Harton's invention in Alderson's invention to provide improved performance as suggested by Alderson (paragraph [0008]).

Regarding claim 12, Alderson further discloses the received energy is infrared radiant flux (Fig. 1, "thermal radiation").

Regarding claim 13, Alderson further discloses the array of coefficients includes gains and offsets determined from actual fixed pattern noise measurements (Fig. 5-516 and 6; paragraphs [0057]-[0059]).

Regarding claim 14, Alderson further discloses the integration time corresponds to the temperature range (Fig. 2A; paragraph [0043]).

Regarding claim 17, Alderson and Endo disclose all the claim limitations of the previous claims except the claim limitation of claim 17. However, Harton discloses generating a voltage from an array of detectors according to the received energy during an integration time of at least one capacitor (Fig. 1-100 and 104; paragraph [0015]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention Harton's invention in Alderson's invention to provide improved performance as suggested by Alderson (paragraph [0008]).

Regarding claim 18, Harton further discloses adjusting the integration time (paragraph [0020]).

8. Claims 6 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alderson et al. (2002/0159101) in view of Endo (US 2004/0017891), and further in view of Tsuruoka (2004/0027469).

Regarding claim 6, Alderson and Endo disclose all the claim limitations of the previous claims except the claim limitation of claim 6. However, Tsuruoka teaches the formulization of the amount of noise that is used when the amount of noise of the pixel of interest is estimated by the coefficient calculating unit (Figs. 5A, 5B, 6A, 6B, and 6C; paragraphs [0060]-[0079]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention Tsuruoka's invention in Alderson's invention to reduce random noise as suggested by Tsuruoka (paragraph [0003]).

Regarding claim 22, Alderson and Endon disclose all the claim limitations of the previous claim except the claim limitation of claim 22. However, Tsuruoka teaches the formulization of the amount of noise that is used when the amount of noise of the pixel of interest is estimated by the coefficient calculating unit (Figs. 5A, 5B, 6A, 6B, and 6C; paragraphs [0060]-[0079]).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention and Tsuruoka's invention in Alderson's invention to reduce random noise as suggested by Tsuruoka (paragraph [0003]).

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alderson et al. (2002/0159101) in view of Endo (US 2004/0017891), in view of Kuwahara (US 5,317,420).

Regarding claim 23, Alderson and Endo disclose all the claim limitations of the previous claim except the claim limitation of claim 23. However, Kuwahara discloses representing a non-noise color (col. 16, lines 54-59).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use Endo's invention and Kuwahara's invention in Alderson's invention to provide improved performance as suggested by Alderson (paragraph [0008]).

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Wahnkyo Lee whose telephone number is (571) 272-9554. The examiner can normally be reached on Monday - Friday (Alt.) 7:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JINGGE WU
SUPERVISORY PATENT EXAMINER

John W. Lee
(AU 2624)